

CLAIMS

1. Injection syringe (1) with retractable injection needle (2), comprising:

- a liquid container (3) having a needle opening (4);
- a plunger/plunger rod assembly, which is moveable over a certain travel in the liquid container (3) and comprises a plunger rod (7), plunger (5) and a plunger head (6);
- an injection needle (2) with needle mount (8) which, in an active position, projects out of the liquid container (3) through the needle opening (4) and, in a retracted position, is located fully within the liquid container (3);
- a travel limiter which comes into action after an injection has been administered using the injection syringe and subsequently the injection needle with needle mount has been moved into the retracted position by the plunger/plunger rod assembly being retracted, after which it restricts the plunger/plunger rod assembly in the event of a movement towards the needle opening (4), in such a manner that the injection needle cannot be pushed out of the liquid container,

characterized in that

the travel limiter comprises a stop mechanism having a stop face (30a) associated with the plunger/plunger rod assembly, and having a stop face (20a; 22a) associated with the liquid container, it being possible for at least one stop face to be displaced between an initial, inactive position, in which an injection can be administered using the injection syringe, and an active position, in which the stop faces actively come into contact with one another and thereby limit the travel of the plunger/plunger rod assembly.

2. Injection syringe according to claim 1, in which a stop face associated with the liquid container is formed by at least one moveable stop (22) which is fitted to the liquid container.

3. Injection syringe according to claim 2, in which a moveable stop is a resilient stop (22).

4. Injection syringe according to one or more of the preceding claims, in which a stop (22) is integral with the liquid container.

5. Injection syringe according to one of claims 2-4, in which a stop (22) is arranged on that side of the liquid container which is remote from the needle opening.

6. Injection syringe according to one or more of claims 2-5, in which a plurality of stops (22), which is moveable between an outer, inactive position and an inner, active position, are arranged around the opening ment for the plunger/plunger rod assembly on that side of the liquid container which is remote from the needle opening.

7. Injection syringe according to one or more of claims 2-6, in which an activation element (40) which actuates the one or more moveable stops (22) is arranged on that side of the liquid container which is remote from the needle opening.

8. Injection syringe according to claim 7, in which the activation element (40) is designed to come into contact with an associated actuation surface (23a) of the plunger/plunger rod assembly, preferably when the plunger/plunger rod assembly is displaced fully inward in order to deliver an injection.

9. Injection syringe according to claim 7 or 8, in which the activation element (40) is an element which is moveable, preferably slideable in the axial direction, with respect to the liquid container, for example a ring element which is located around the one or more stops (22) and is moveable as a result of an actuating surface (23a) of the plunger/plunger rod assembly coming into contact with it.

10. Injection syringe according to claim 9, in which the activation element (40) has associated locking means (42) for locking the activation element (40) in the position in which the one or more stops (22) are active.

11. Injection syringe according to one or more of claims 6-10, in which the liquid container, at the end remote from the needle opening (4), has an annular wall (19), inside which the activation element (40) is arranged.

12. Injection syringe according to claim 1, in which a stop face (20a) associated with the liquid container is formed by a stop element (16) that is guided slideable on the plunger rod, for example an annular stop element (16) positioned around the plunger rod, the stop element and the liquid container being provided with interacting coupling means (17, 18) which are designed in such a manner that when the plunger/plunger rod assembly moves inwards in order to discharge liquid from the injection syringe, the stop element (16) is coupled to the liquid container (3).

13. Injection syringe according to claim 12, in which the stop face (30a) associated with the plunger/plunger rod assembly, during the retraction of the plunger/plunger rod assembly, moves past the one or more stop faces (20a) of the stop element, in such a manner that in the event of the assembly being moved inwards again the stop faces come into contact with one another.

14. Injection syringe according to one or more of the preceding claims, in which a stop face (30a) of the plunger/plunger rod assembly is arranged at a recess (21), which is open towards the side, in the assembly, preferably in the plunger rod (7), with a series of recesses (21), which are preferably distributed over the longitudinal axis of the plunger rod, being provided if appropriate.

15. Injection syringe according to claim 14, in which part of the plunger rod (7) is cross-shaped in cross section, with longitudinal ribs (31) and longitudinal grooves (32), a stop face of the assembly being formed by a stop formation (30) in a longitudinal groove, for example a circular disc formation.

16. Injection syringe according to claim 13 or 14, in which the coupling means comprise one or more recesses (18) in the liquid

container and one or more hook members (17) on the stop element (16).

17. Injection syringe according to one or more of the preceding claims, in which the plunger rod is provided with a locally weakened section as a break-off zone (14).

18. Injection syringe according to one or more of the preceding claims, in which coupling means (13, 15) are provided for coupling the plunger/plunger rod assembly, preferably the plunger head (6) thereof, to the needle mount (8) after the liquid container (3) has been substantially emptied.

19. Plunger rod (7) described as a component of the injection syringe (1) according to one or more of the preceding claims.

20. Travel limiter described as a component of the injection syringe (1) according to one or more of the preceding claims.

21. Liquid container (3) described as a component of the injection syringe (1) according to one or more of the preceding claims.

22. Set composed of a liquid container (3), a plunger rod (7) and a travel limiter described as one or more components in the preceding claims.